

## CLAIMS

1. A particle-dispersed complex, wherein fine particles having a particle diameter of 5 ~ 100 nm which include ruthenium element as a constituent element are dispersed in a matrix having carbon as a main component, and said complex has electrical conductivity.
2. The particle-dispersed complex according to Claim 1, wherein the entire surface of said fine particles makes contact with at least either said matrix or said fine particles.
3. The particle-dispersed complex according to Claim 1, wherein said matrix includes carbon black or nanocarbon.
4. The particle-dispersed complex according to Claim 1, wherein said fine particles are ruthenium metallic fine particles, ruthenium oxide fine particles or surface-oxidized ruthenium metallic fine particles, or a mixture of these fine particles.
5. The particle-dispersed complex according to Claim 1, 2, 3 or 4, wherein said complex is held on an electrically conductive substrate.
6. The particle-dispersed complex according to Claim 1, 2, 3, 4 or 5, wherein said complex is formed on a solid electrolyte substrate.
7. The particle-dispersed complex according to Claim 6, wherein the interfacial electrical conductivity  $\sigma$  of the solid electrolyte substrate and a thin film formed from said particle-dispersed complex formed on the surface of said

solid electrolyte substrate is  $10^{-6} \text{ Sm}^{-1}$  or higher and  $10^{-2} \text{ Sm}^{-1}$  or lower at 190 ~ 350°C.

8. The particle-dispersed complex according to Claim 6 or 7, wherein said solid electrolyte substrate is a zirconium oxide substrate which includes a stabilizing agent.

9. The particle-dispersed complex according to Claim 1, 2, 3, 4, 5, 6, 7 or 8, wherein said complex is a sensor electrode of a solid electrolyte sensor or an electrode for a solid electrolyte.

10. The particle-dispersed complex according to Claim 1, 2, 3, 4, 5, 6, 7, 8 or 9, wherein said complex is an electrochemical catalyst.

11. A solid electrolyte sensor, wherein a particle-dispersed complex formed by dispersing fine particles having a particle diameter of 5 ~ 100 nm which include ruthenium element as a constituent element in a matrix having carbon as a main component and having electrical conductivity is formed as an electrode on the surface of a zirconium oxide substrate which includes a stabilizing agent.

12. The solid electrolyte sensor according to Claim 11, wherein the entire surface of said fine particles makes contact with at least either said matrix or said fine particles.